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JOSEPH S. TRIPOLI
THOMSON MULTIMEDIA LICENSING INC.
2 INDEPENDENCE WAY
P. O. BOX 5312
PRINCETON, NJ 08543-5312

EXAMINER

CHEN, PO WEI

ART UNIT	PAPER NUMBER
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2676

DATE MAILED: 03/10/2004

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/964,125

Applicant(s)

WILLIS, DONALD HENRY

Examiner

Po-Wei (Dennis) Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-24 and 27-35 is/are rejected.
- 7) ☒ Claim(s) 25 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

In response to an Amendment received on December 22, 2003. This action is final.

Claims 19-35 are pending in this application. Claims 19 and 35 are independent claims.

The present title of the invention is "Reduction of Gamma Correction Contouring in Liquid Crystal on Silicon Displays".

The Group Art Unit of the Examiner case is now 2676. Please use the proper Art Unit number to help us serve you better.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clatanoff et al. (US 6,052,491; refer to as Clatanoff herein) in view of McKnight et al. (US 6,373, 497; refer to as McKnight herein).

3. Regarding claim 32, Clatanoff discloses method for contour diffusion comprising:

A system for reducing contouring caused by repeated displayed pixel brightness levels in a display (lines 5-41 of column 3 and lines 35-54 of column 6 and Fig. 13-14);

A receiver for receiving an input signal comprising successive pictures, each of said successive pictures having a corresponding intended brightness level for each pixel (lines 7-17 of column 4 and lines 35-54 of column 6 and Fig. 13-14; element 304 corresponds to receiver;

while claim recites successive pictures, it is noted that the input signal is in form of frames outputting to the display and brightness level is displayed in pixel level);

A display for displaying each of said successive pictures with a displayed pixel brightness level for each pixel (lines 7-17 of column 4 and lines 35-54 of column 6 and Fig. 13-14);

A system for transferring each of said pictures from said receiver to said display such that said displayed brightness levels of said pixels approximately matches said intended brightness levels of said pixels for each successive pictures (line 20 of column 5 to line 54 of column 6 and Fig. 13-14);

Said system characterized by a transfer function relating said displayed pixel brightness levels to said intended pixel brightness levels, said transfer function including an imager gamma (lines 5-41 of column 3, lines 7-17 of column 4 and lines 35-43 of column 6 and Fig. 13-14);

Said system including an imager coupled to a gamma correction unit to cause said imager to operate in accordance with a gamma corrected transfer function (lines 5-41 of column 3, lines 7-17 of column 4, lines 35-43 of column 6 and lines 8-11 of column 8 and Fig. 13-14; element 1404 correspond to imager);

Said gamma corrected transfer function having associated therewith a number of repeated displayed brightness levels corresponding to different intended brightness levels (lines 5-41 of column 3, lines 7-17 of column 4, lines 20-36 of column 5 and lines 35-43 of column 6 and Fig. 13-14; it is noted that pixels with intended low or high brightness levels can have equal magnitude of intensity);

A dithering unit coupled to said system to reduce the number of said repeated displayed pixel brightness levels corresponding to different intended pixel brightness levels (lines 5-41 of column 3, lines 7-17 of column 4, lines 8-19 and 51-59 of column 5 and lines 4-43 of column 6 and Fig. 13-14; it is noted that input values of pixels with same output level are dithered to produce more accurate output; and while claim recites dithering unit, it is clear the dithering is performed by the system which correspond to a dithering unit).

Clatanoff does not disclose LCOS display. McKnight teaches a time sequential lookup table arrangement for a display that utilize such a display (lines 18-20 of column 1). It would have been obvious to one of ordinary skill in the art at the time of invention to substitute the display of McKnight for the display of Clatanoff because McKnight teaches that by utilizing a LCOS display will provide a display with faster performance (see lines 21-23 of column 1, McKnight).

4. Claims 19-21, 23-24 and 27-30 rejected under 35 U.S.C. 103(a) as being unpatentable over Clatanoff et al. (US 6,052,491; refer to as Clatanoff herein) in view of Koyama et al. (US 6,144,354; refer to as Koyama herein) and McKnight et al. (US 6,373, 497; refer to as McKnight herein).

5. Regarding claim 19, Clatanoff discloses method for contour diffusion comprising:

A method of reducing contouring in a display comprising individually controllable pixels, the display including at least one gamma correction table having a corresponding table resolution (lines 52-61 of column 2, lines 24-41 of column 3 and lines 35-54 of column 6);

Providing an input signal comprising successive pictures to be displayed on said display (lines 18-41 of column 4 and lines 4-27 of column 6 and Fig. 3 and 13; while claim recites

successive pictures, it is noted that the input signal is in form of frames outputting to the display);

Reducing the number of said pixels having repeated brightness levels in successive pictures without changing said table resolution (lines 8-19 and 51-59 of column 5 and lines 4-43 of column 6; it is noted that input values of pixels with same output level are dithered to produce more accurate output).

Clatanoff does not disclose applying a first set of gamma correction values to a first picture portion of each of said successive pictures to provide corresponding gamma corrected first picture portions for each successive picture; applying a second set of gamma correction values to a second picture portion of each of said successive pictures to provide corresponding gamma corrected second picture portions for each successive picture; combining said gamma corrected first picture portion with said gamma corrected second picture portion to provide a picture comprising pixels having brightness levels determined by the combined picture portions. Koyama discloses a image display apparatus utilizing the function (lines 32-41 of column 13 and Fig. 2 and 7-14). It would have been obvious to one of ordinary skill in the art to substitute the method of applying gamma correction values of Koyama for the method of applying gamma correction values of Clatanoff because Koyama teaches that by utilizing the method will provide the advantage of maintaining image quality even with variations of gain or offset occur and is also capable of performing polarity inversion and phase expansion (lines 28-49 of column 2).

The combination of Clatanoff and Koyama does not disclose LCOS display. McKnight teaches a time sequential lookup table arrangement for a display that utilize such a display (lines 18-20 of column 1). It would have been obvious to one of ordinary skill in the art at the time of

invention to substitute the display of McKnight for the display of Clatanoff because McKnight teaches that by utilizing a LCOS display will provide a display with faster performance (see lines 21-23 of column 1, McKnight).

6. Regarding claim 20, Clatanoff discloses method for contour diffusion comprising:

The reducing step is carried out by applying a dither to said input signal (lines 8-19 and 51-59 of column 5 and lines 4-43 of column 6).

7. Regarding claim 21, Clatanoff discloses method for contour diffusion comprising:

The reducing step is carried out by applying a dither to one of said first and second sets of gamma correction values (lines 52-59 of column 5 and lines 35-43 of column 6; translation using gamma lookup table correspond to gamma correction values).

8. Regarding claim 23, Clatanoff discloses method for contour diffusion comprising:

Providing reference gamma correction values; modifying said reference values to provide said first set of gamma correction values (lines 24-41 of column 3, lines 52-59 of column 5 and lines 35-43 of column 6; translation using gamma look-up table correspond to reference gamma correction values and it is being dithered or modified).

9. Regarding claim 24, Clatanoff discloses method for contour diffusion comprising:

The modifying step is carried out by a step of changing least significant bits of said reference gamma correction values to provide said first set of gamma correction values (lines 4-27 of column 6).

10. Regarding claims 27 and 28, Clatanoff does not disclose first picture portion is a positive picture portion and said second picture portion is a negative picture portion and second picture portion is a positive picture portion and said first picture portion is a negative picture portion.

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Koyama discloses an image display apparatus utilizing such pictures (lines 32-41 of column 13 and Fig. 2 and 7-14). It would have been obvious to one of ordinary skill in the art to substitute the method of applying gamma correction values to different portions of pictures of Koyama for the method of applying gamma correction values of Clatanoff because Koyama teaches that by utilizing the method will provide the advantage of maintaining image quality even with variations of gain or offset occur and is also capable of performing polarity inversion and phase expansion (lines 28-49 of column 2).

11. Regarding claims 29 and 30, Clatanoff discloses method for contour diffusion comprising:

At least one gamma correction table is a primary color gamma correction table and primary color is selected from the graph comprising red, green and blue (lines 65-67 of column 4 and lines 1-7 of column 5).

12. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clatanoff et al. (US 6,052,491; refer to as Clatanoff herein), Koyama et al. (US 6,144,354; refer to as Koyama herein) and McKnight et al. (US 6,373, 497; refer to as McKnight herein) as applied to claim 19 above, and further in view of Ishida et al. (US 6,069,609; refer to as Ishida herein).

13. Regarding claim 22, Clatanoff discloses method for contour diffusion comprising:

Applying a dither to gamma correction value (lines 52-59 of column 5 and lines 35-43 of column 6; translation using gamma lookup table correspond to gamma correction values).

Clatanoff does not disclose first and second sets of gamma correction values. However, this is known in the art taught by Koyama, statements presented above, with respect to claim 19 are incorporated herein.

The combination of Clatanoff, Koyama and McKnight does not disclose applying a dither to input signal. Ishida discloses a image processing utilizing the method (lines 1-5 of column 3). It would have been obvious to substitute the method of dithering of Ishida for the method of dithering of Clatanoff because Ishida teaches that by utilizing the dithering will suppress flicker and thus provide better quality image (lines 4-5 of column 3).

14. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clatanoff et al. (US 6,052,491; refer to as Clatanoff herein), Koyama et al. (US 6,144,354; refer to as Koyama herein) and McKnight et al. (US 6,373, 497; refer to as McKnight herein) as applied to claim 19 above, and further in view of Wu et al. (US 6,469,708; refer to as Wu herein).

15. Regarding claim 31, Clatanoff discloses method for contour diffusion comprising:
Input signal is an 8-bit signal (Fig. 10).

The combination of Clatanoff, Koyama and McKnight does not disclose said gamma correction table has a resolution of 10 bits. Wu teaches an image dithering device that utilize such size of data (lines 11-23 of column 2). It would have been obvious to one of ordinary skill in the art at the time of invention to substitute the 10 bits gamma correction table of Wu for the gamma correction table of Clatanoff because Wu teaches utilizing such table will improve image quality (see lines 17-21 of column 2).

16. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clatanoff et al. (US 6,052,491; refer to as Clatanoff herein) and McKnight et al. (US 6,373, 497; refer to as McKnight herein) as applied to claim 32 above, and further in view of Koyama et al. (US 6,144,354; refer to as Koyama).

17. Regarding claim 33, statements presented above, with respect to claims 19 and 27 are incorporated herein. Also, it is noted that the reduced number of repeated displayed pixel brightness levels associated with said gamma corrected transfer function (lines 20-36 of column 5 and lines 35-43 of column 6 of Clatanoff).

18. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clatanoff et al. (US 6,052,491; refer to as Clatanoff herein) and McKnight et al. (US 6,373, 497; refer to as McKnight herein) as applied to claim 32 above, and further in view of Ishida et al. (US 6,069,609; refer to as Ishida herein).

19. Regarding claim 34, statements presented above, with respect to claims 19 and 22 are incorporated herein.

Allowable Subject Matter

20. Claims 25-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

21. Applicant's arguments with respect to claims 19 and 32 have been considered but are moot in view of the new ground(s) of rejection.

The Applicant questions that whether it would have been obvious to one of ordinary skill in the art at the time of invention to utilize the teaching of McKnight to provide an LCOS display in combination with Clatanoff. However, Clatanoff discloses that the display can be CRT or similar display device. And by utilizing the LCOS display, it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the display of McKnight for the

display of Clatanoff because McKnight teaches that by utilizing a LCOS display will provide a display with faster performance (see lines 21-23 of column 1, McKnight).

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tahara (US 6,674,444);

Kasahara et al. (US 6,414,657);

Pettitt et al. (US 6,040,876);

Accad (US 5,553,200);

Pappas et al. (US 5,309,526).

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Inquiry

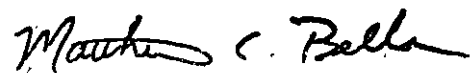
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Po-Wei (Dennis) Chen whose telephone number is (703) 305-8365. The examiner can normally be reached on Monday-Thursday from 8:30 AM to 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C Bella can be reached on (703) 308-6829. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Po-Wei (Dennis) Chen
Examiner
Art Unit 2676

Po-Wei (Dennis) Chen
March 4, 2004



MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600